

REMARKS

The application has been amended to place the application in condition for allowance at the time of the next Official Action.

A substitute Abstract of the Disclosure is submitted taking into account the suggestions noted in the Official Action. By the above, the objection to the abstract is believed addressed and withdrawal of the same is respectfully requested.

Claims 1-7, 10-12, 16, 21-26, 30, 31 and 34-39 are pending in the application.

Applicants note with appreciation the indication that claims 5-7, 10, 36 and 37 are allowed and that claims 11 and 12 are allowable.

Claims 21, 22 and 34 were rejected under 35 USC 103(a) over CARLE et al. 5,167,790 in view of CHAN et al. 6,696,022. Claims 16, 30 and 31 were rejected further in view of SHIMOIDE et al. 7,105,354. Claims 1-4, 23-26, 38 and 39 were rejected under 35 USC 103(a) over CARLE in view of CHAN and further in view of ANDERSON et al. US Pub. No. 2001/00366720 and PETHIG et al. WO97/34689. Claim 35 was rejected further in view of HANCOCK et al. 5,716,825.

The above rejections are respectfully traversed because each rejection includes the CARLE/CHAN combination, which is an improper combination of references.

The Official Action recognizes that CARLE does not teach compartments consistent with how one of ordinary skill in the art would construe this term since the lanes of CARLE are not enclosed. The Official Action offers CHAN for this feature and concludes that it would have been obvious to modify CARLE to allow a cleaner separation of the fractionated samples.

However, the proposed modification would not have been obvious to one having ordinary skill in the art.

CARLE uses a gel layer or slab 16 that is made out of a uniform material. Having walls separating the device of CARLE would not enable CARLE to use such a layer and thus, an accurate comparison of substances across the layer could not be obtained.

Moreover, the walls defining the channels of CHAN are used to create shear forces to stretch out the polymers of CHAN. Such shear forces would undesirably affect the separation attempted to be achieved by CARLE.

In addition, any parallel channels in CHAN either include side passages or obstacles to cause stretching. It is impermissible hindsight reasoning to pick the parallel walls (or any walls) of CHAN while ignoring the side passages or obstacles, because these features are necessary for the full appreciation of what CHAN fairly teaches and suggests to one of ordinary skill in the art (i.e., the creation of shear forces through the use of either funneled walls or parallel walls with side passages or obstacles).

Furthermore, the reasoning in support of the rejection does not possess a rational underpinning to support the legal conclusion of obviousness. The use of parallel channels that allow high resolution of separation, in order to achieve high throughput of sample separation (or selection, or screening, or in general sense, sample characterization) necessarily includes the side passages or obstacles in such channels. Thus, the picking of the channels to the exclusion of the side passages or obstacles and the reasoning offered in the Official Action to combine the references do not support the legal conclusion of obviousness.

Finally, incorporation of the side passages or obstacles in the CARLE system would lead to inoperability (prevent formation of bands). The modification of CARLE as proposed would create items that exert an influence on the macromolecules of CARLE and would lead to the inoperability of the CARLE apparatus. See column 1, lines 27-36 disclosing the importance of the support not exerting any influence on the macromolecules in the mixture.

CARLE discloses about vector field electrophoresis, however, according to this technique, only a single lading of a mixture sample is possible. On the other hand, according to the present invention, sequential lading of mixture samples are possible. According to the present invention, the components of the sample can be separated into any one of the compartments of

the channel based on the length of each of the compartments, a period of times to impose an external force, and the moving speed of each of the components. This mechanism is not obvious from CARLE and CHAN.

For the reasons set forth above, the combination of CARLE and CHAN would not have been obvious due to the resulting inoperability and thus, is improper and cannot be maintained. The addition of SHIMOIDA, ANDERSON, PETHIG or HANCOCK does not overcome this shortcoming.

Moreover, as for SHIMOIDE, page 6, line 20 to page 7, line 2 of the Office Action states that SHIMOIDE et al. expressly recite a particular embodiment in which the sample is diverted from the main channel into the sub-channels, etc. SHIMOIDE just discloses independent embodiments and never mentions about imposing a first external force and a second external force having a different forcing direction from the first as recited in the present invention. In addition, although the examiner mentions in page 7 line 19 to page 8 line 2 of the Office Action about reverse electrophoresis, such general teaching is not enough. The timing for imposing a reverse force is important. If the shape of the channel (length of the channel) and the imposing period are not appropriately controlled, only reverse movement of the sample occurs and the components cannot be separated properly.

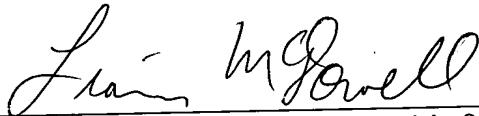
The references do not meet the present claims.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item:

- an amended Abstract of the Disclosure